NAVELEX 0967-LP-880-0010

(Non-Registered)

TECHNICAL MANUAL

for

POWER SUPPLY PP-3495/UG

PUBLISHED BY DIRECTION OF COMMANDER, NAVAL ELECTRONIC SYSTEMS COMMAND

REV. BASIC W/CHG. 01

PERMANENT CHANGE NUMBER 1
TO NAVSHIPS 94503
INSTRUCTION SHEET

1. GENERAL.

1.1 This change is in effect upon receipt and supersedes the basic publication for the pages affected.

1.2 The purpose of this change is to bring the basic publication up to date with equipment production changes. This change applies to all manuals and equipment in service.

2. INSTRUCTIONS.

2.1 Starting at the rear of the book, insert Table 7-4 in front of the NOTE page.

2.2 Working toward the front of the book, insert new pages; and remove superseded pages and replace them with the change pages.

2.3 Before securing the front cover make sure that all change pages are in place and that no superseded pages remain in the book.

2.4 Destroy superseded pages by tearing them and disposing of them in any convenient manner

2.5 When the manual has been completely re-assembled, proceed with the pen-and-ink corrections as outlined below.

3. PEN-AND-INK CORRECTIONS.

3.1 The purpose of making pen-and-ink corrections is to avoid the unnecessary handling of additional pages that have minor changes or corrections. Mark each page according to the instructions given. All page, paragraph, line, figure, and table numbers specified in the instructions, unless otherwise specified, refer to those of the original or existing pages in the book and not those just inserted. After marking a page, change the word "ORIGINAL" at the bottom of the page to "CHANGE 1".

Page v, List of Illustrations, Section 1:
Add "Figure 1-3 Power Supply PP-3495B/UG....Page 1-3".

Page vi, List of Illustrations, Section 3:
Add "Figure 3-2 Power Supply PP-3495B/UG, Front View....Page 3-1".

Page vi, List of Illustrations, Section 6:
Figure 6-1: Insert "and Power Supply PP-3495B/UG (Protective Fuse Cover Removed)" after "PP-3495/UG,".

PERMANENT CHANGE NUMBER 1
TO NAVSHIPS 94503
INSTRUCTION SHEET (Cont)

Page vi, List of Tables, Section 7:
Table 7-1: Insert comma after "List" and add "Power Supply PP-3495/UG".

Page vi, List of Tables, Section 7:
Table 7-2: Insert comma after "Manufacturers " and add "Power Supply PP-3495/UG".

Page vi, List of Tables, Section 7:
Add "Table 7-3 Supplementary Parts List, Power Supply PP-3495B/UG....Page 7-4".

Page vi, List of Tables, Section 7:
Add "Table 7-4 List of Manufacturers, Power Supply PP-3495B/UG....Page 7-6".

Page 6-2, Figure 6-1:
Insert "and Power Supply PP-3495B/UG (Protective Fuse Cover Removed)" after 'PP-3495/UG,".

Page 7-2, Table 7-1:
Insert comma after "List" and add "Power Supply PP-3495/UG".

Page 7-3, Table 7-1:
Insert "Maintenance Parts List, Power Supply PP-3495/UG" after "Table 7-1".

Page 7-3, Table 7-2:
Insert comma after "Manufacturers" and add "Power Supply PP-3495/UG."

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TECHNICAL MANUAL

for

POWER SUPPLY PP-3495/UG

and

PP3495B/UG

PUBLISHED BY DIRECTION OF COMMANDER, NAVAL ELECTRONIC SYSTEMS COMMAND

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Title	Change 1	4-1	Original
ii	Change 1	5-0	Original
iii to vi	Original	6-1 to 6-4	Original
1-1 to 1-2	Original	7-1 to 7-3	Original
1-3	Change 1	7-4 to 7-6	Change 1
2-0 to 2-1	Original		
3-0	Original		

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From: Chief, Bureau of Ships
To: All Activities concerned with the Installation, Operation, and Maintenance of the Subject Equipment

Subj: Technical Manual for Power Supply PP-3495/UG, NAVSHIPS 94503

1. This is the Technical Manual for the subject equipment and is in effect upon receipt.

2. When superseded by a later edition, this publication shall be destroyed.

3. Extracts from this publication may be made to facilitate the preparation of other Department of Defense publications.

4. Errors found in this publication (other than obvious typographical errors), which have not been corrected by means of Temporary Corrections or Permanent Changes should be reported. Such reports should include the complete title of the publication and the publication number (short title); identify the page and line or figure and location of the error; and be forwarded to the Publications Section of the Bureau of Ships.

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Chief of BUREAU

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CHANGE NO.	DATE	FIELD CHANGE NO.	SIGNATURE

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SECTION 7 - PARTS LIST

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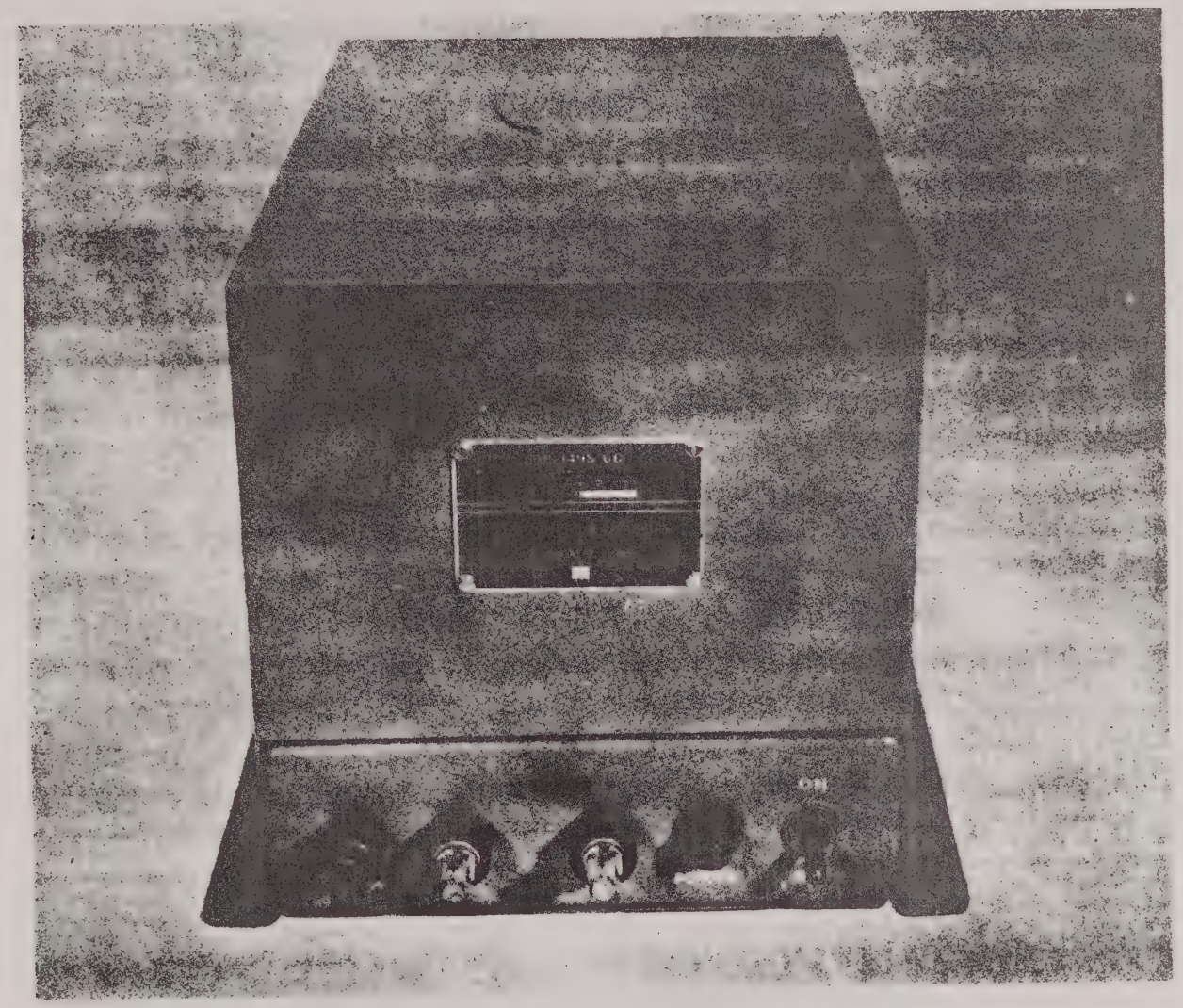


Figure 1-1. Power Supply, PP-3495/UG

SECTION I
GENERAL INFORMATION

1-1. FUNCTIONAL DESCRIPTION.

Power Supply PP-3495/UG is a unit designed to produce either 120 or 48 volts d.c. when operated from a 120-volt a.c. 50- or 60-cycle supply. The d.c. voltage output is regulated and will remain constant within plus or minus 5% with an a.c. voltage input change of plus or minus 10% at a load of 1.0 ampere.

Power Supply PP-3495/UG is intended to be used as a d.c. supply for the operation of teletypewriters, radio adapters, and associated equipments.

Figure 1-2 shows Power Supply PP-3495/UG used in a typical radio teletype system.

No vacuum tubes are used and the unit requires no operation adjustments.

The circuit comprises a power transformer, a silicon bridge rectifier, an inductance-capacitance filter, and a d.c. voltage regulator consisting of a magnetic amplifier and Zener diodes. Fuses are provided for overload and short circuit protection and a pilot light indicates when the power is on.

1-2. REFERENCE DATA.

a. Navy Type: Power Supply PP-3495/UG

Commercial Type: Power Supply DE1034

b. Contract: NObsr-87318

c. Contractor: Futuronics Corporation, Port Washington, N.Y.

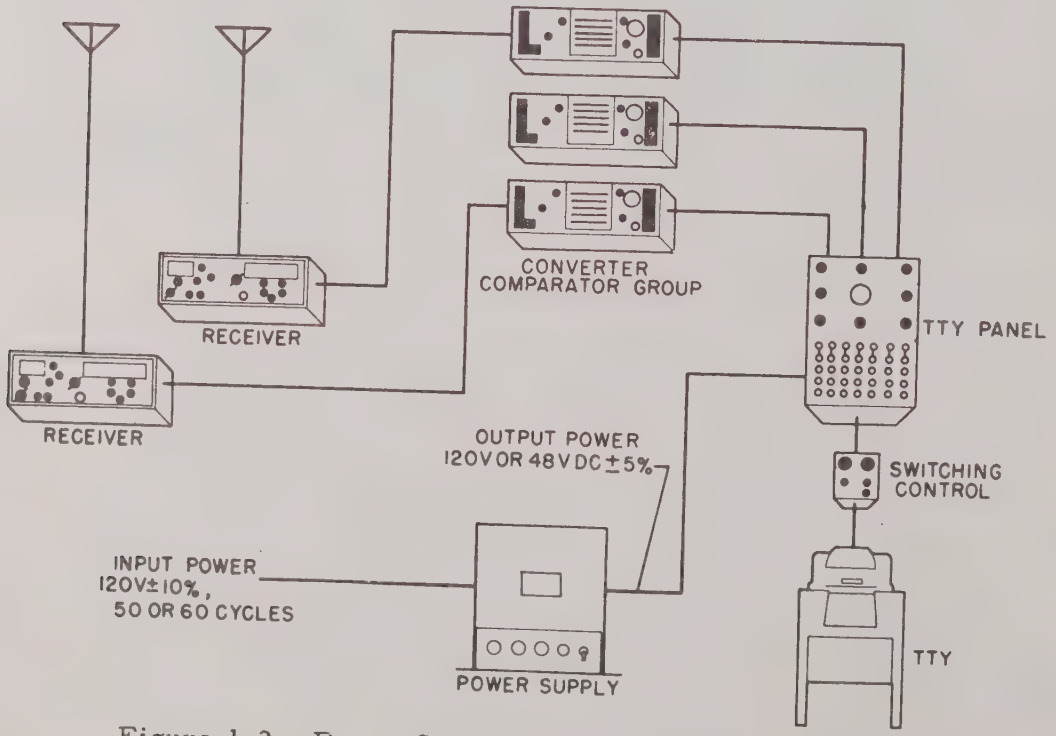


Figure 1-2. Power Supply PP-3495/UG, System Diagram

d. Inspector: Inspector of Naval Material, Garden City, N. Y.

e. Number of Packages: One complete unit per package

f. Cubical Contents: 855 cubic inches uncrated

g. Total Weight: 38 pounds

h. Power Supply: 120 volts, plus or minus 10%, 50 or 60 cycles, plus or minus 5%, single phase

i. Output Voltage: 120 or 48 volts d.c., plus or minus 5% at 1.0 ampere

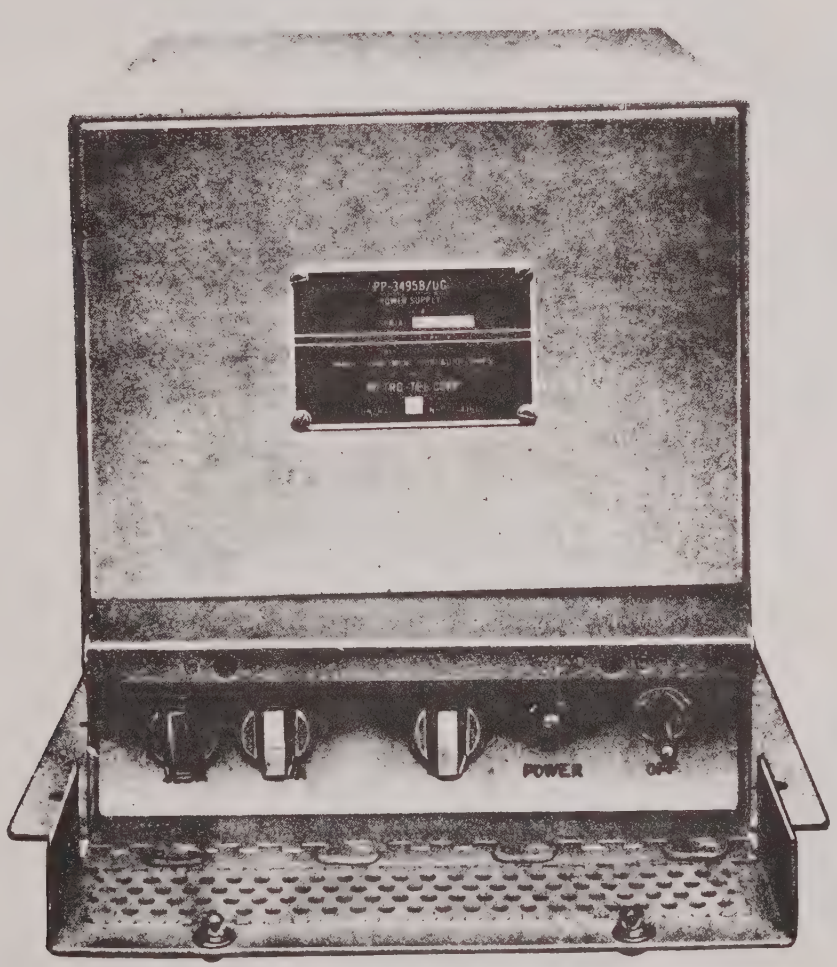


Figure 1-3. Power Supply, PP-3495B/UG

SECTION 2
INSTALLATION

2-1. SITE SELECTION.

Power Supply PP-3495/UG may be located on any shelf, table, deck, or other horizontal surface. Sufficient clearance should be provided from other equipment and structures to allow adequate ventilation.

Figure 2-1, Power Supply PP-3495/UG Outline Drawing, indicates the over-all dimensions. Six 1/4-20 bolts are required to fasten the unit to its foundation.

2-2. POWER REQUIREMENTS.

Power Supply PP-3495/UG operates from a 120-volt, 50- or 60-cycle, single phase supply.

A removable plate is provided on the rear of the cabinet for access to the cable terminations and voltage adjustment control R5. Cable entrance area for stuffing tube is indicated on enclosure as shown in figure 2-1.

2-3. TERMINAL BOARD CONNECTIONS.

Terminal board connections for output voltages of 48 volts and 120 volts are shown in figures 2-2 and 2-3.

2-4. VOLTAGE ADJUSTMENT.

After connecting as shown in figures 2-2 or 2-3 for the desired voltage, fine adjustment of voltage is obtained by means of control R5. To adjust R5, loosen locking nut, turn shaft with screwdriver for desired setting and retighten locking nut.

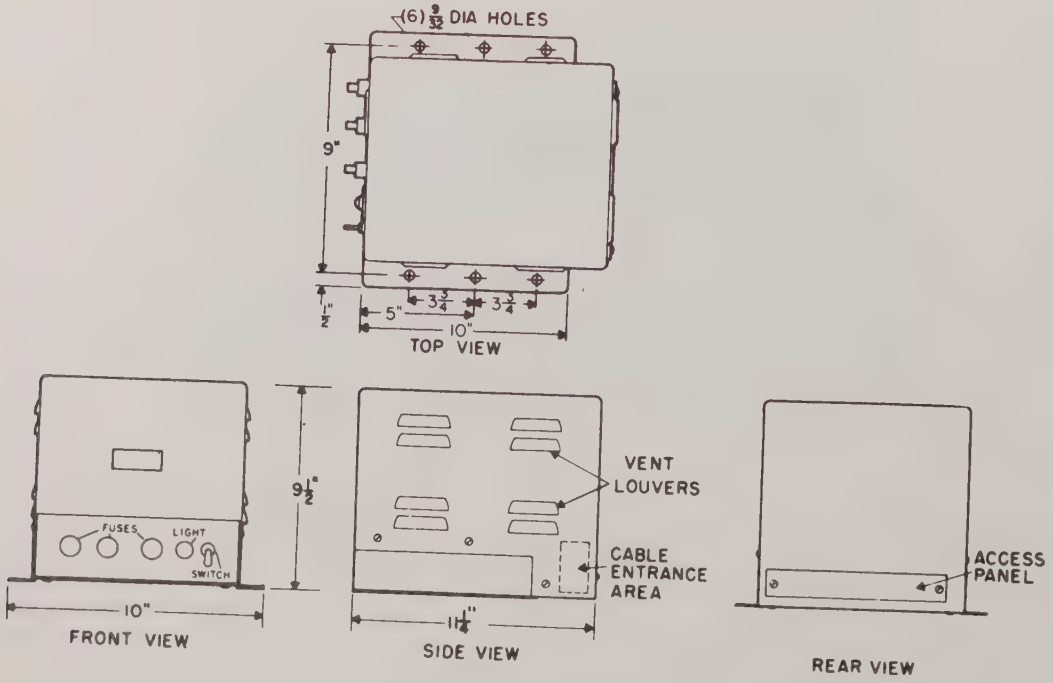


Figure 2-1. Power Supply PP3495/UG, Outline Drawing

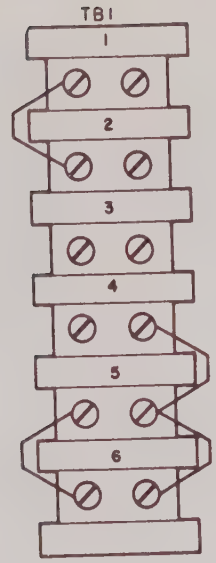


Figure 2-2. Terminal Board Connection 48-Volt Output

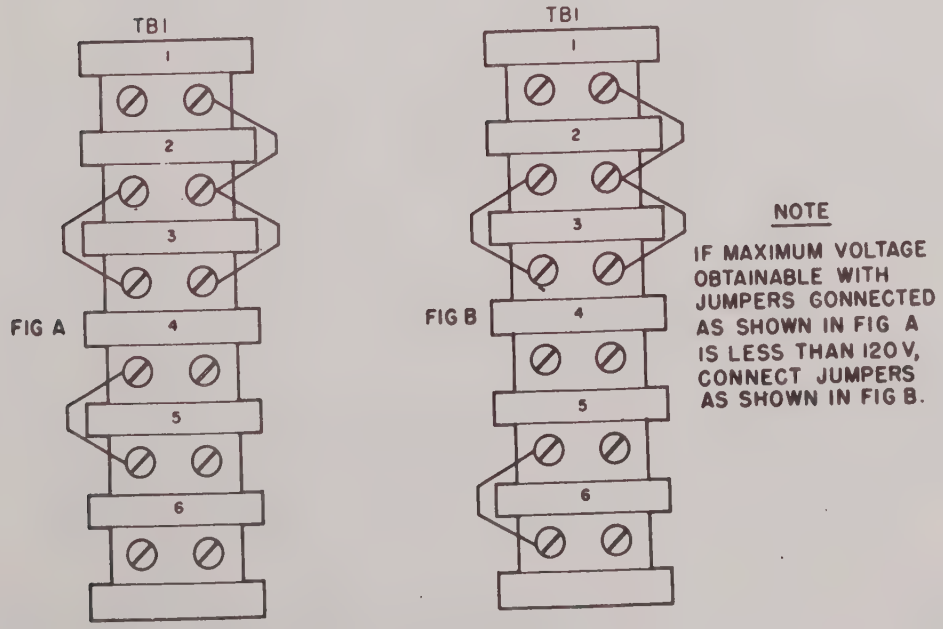


Figure 2-3. Terminal Board Connections 120-Volt Output

SECTION 3
OPERATION

3-1. OPERATING PROCEDURES.

With Power Supply PP-3495/UG properly wired to the a.c. source and its d.c. load, and set for desired output voltage as per paragraph 2-4, it is energized by placing the a.c. power line switch in the ⊙N position. The power light DS1 should come on, indicating that a.c. power is available to the Power Supply.

Figure 3-1, Power Supply PP-3495/UG, Front View, shows the location of the power line, switch, power light and fuses.

Power Supply PP-3495/UG may be closed down by placing the a.c. power line switch S1 to the OFF position. No other operation or special precautions are necessary.

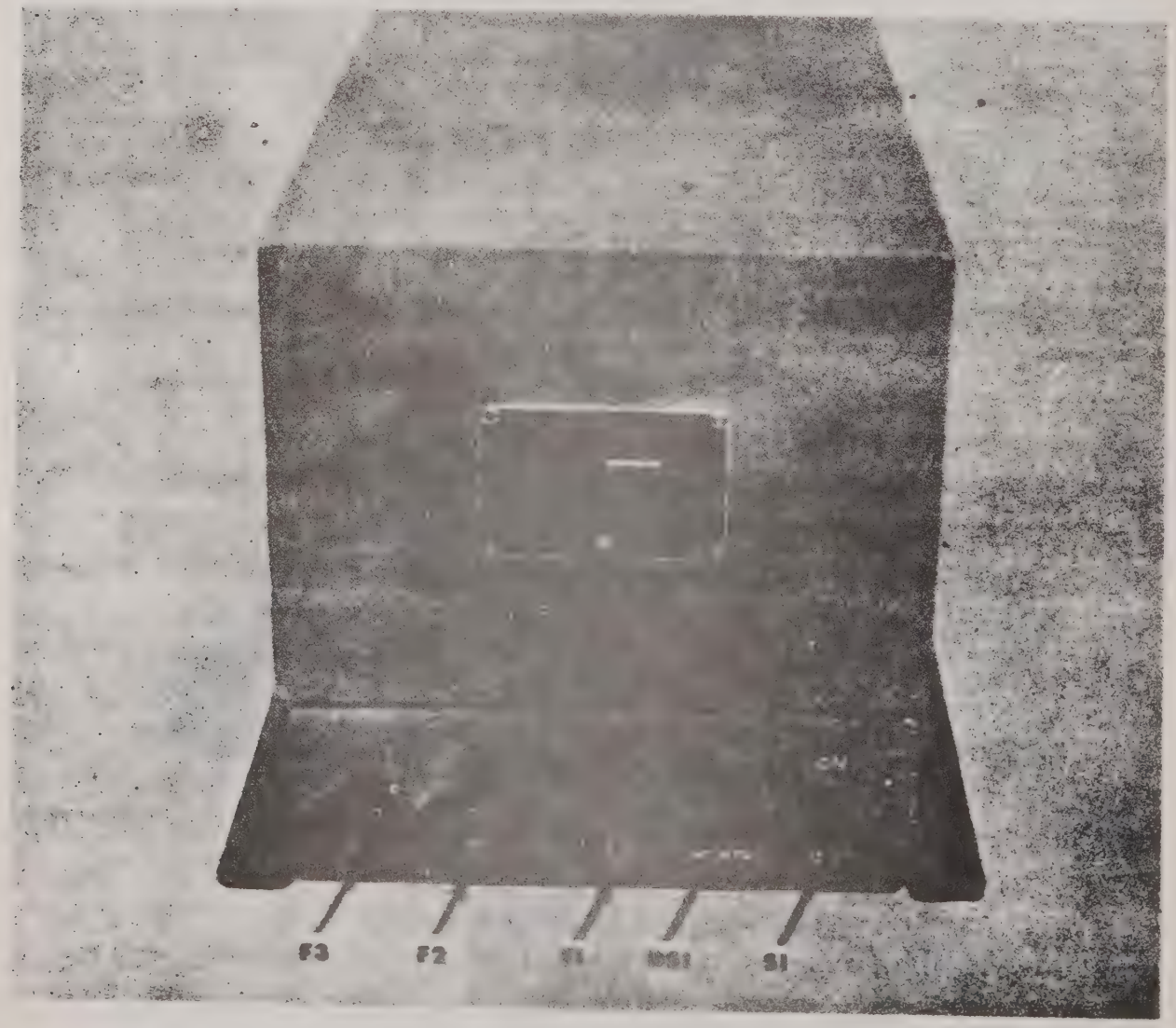


Figure 3-1. Power Supply PP-3495/UG, Front View

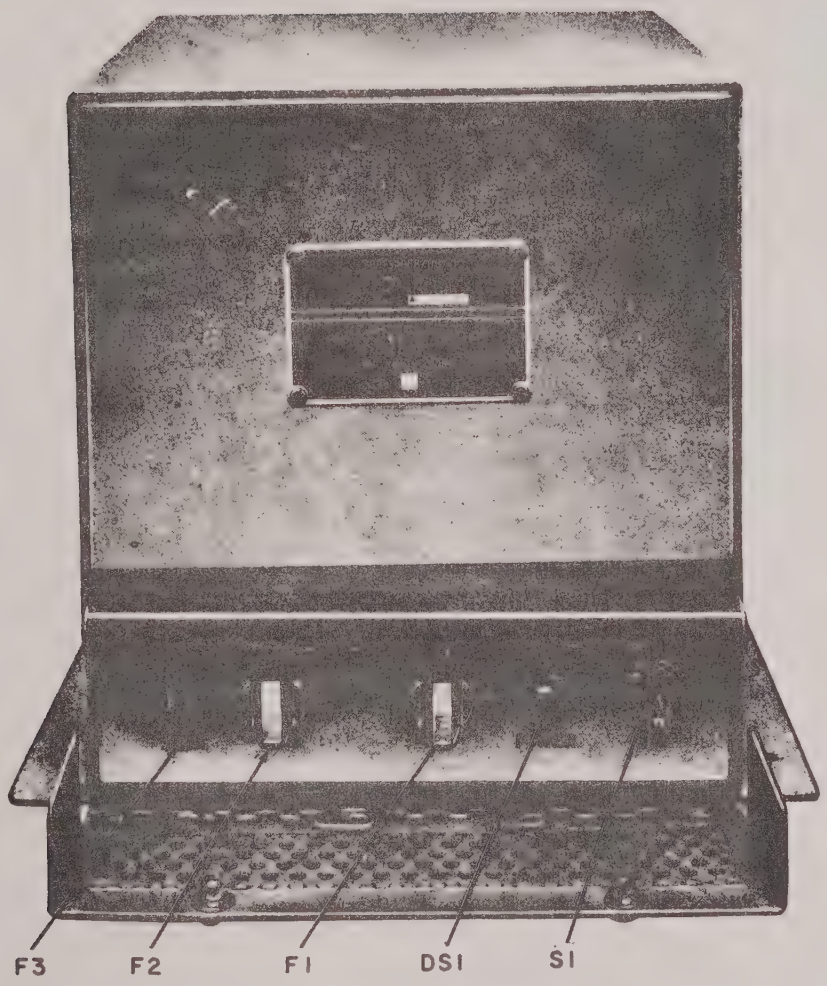


Figure 3-2. Power Supply PP-3495B/UG, Front View

SECTION 4
PRINCIPLES OF OPERATION

4-1. FUNCTIONAL DESCRIPTION.

Power Supply PP-3495/UG (see figure 6-2) operates from a 120-volt, 50- or 60-cycle, single phase, a.c. source. Terminal board TB1 may be connected for an output voltage of 48 volts (see figure 2-2) or 120 volts (see figure 2-3).

When switch S1 is in the ON position, input power is applied through radio frequency interference filter Z2, lighting POWER indicator DS1. The negative half-cycle of the input voltage is passed through diode CR7 and an input winding of the magnetic amplifier to the primary of Transformer T1. The positive half-cycle is passed by diode CR8 and the other input winding of the magnetic amplifier to the primary of transformer T1. The magnetic amplifier provides voltage regulations as described below.

The voltage across the primary of transformer T1 is induced across the secondary which provides outputs of approximately 48 volts and 120 volts on pins 6 and 7, respectively. The voltage is stepped-down across the center-tapped secondary which provides two 9-volt outputs. The center-tapped secondary is a voltage supply used to compensate for variations caused by the 5% tolerance of the Zener diodes, CR1 and CR2. The selected voltage (either 48 volts or 120 volts) is full-wave rectified by bridge rectifier CR3, CR4, CR5, and CR6. For a 48-volt output, the rectified voltage is filtered by inductor L1 and capacitor C1; resistor R4 is a bleeder. For a 120-volt output, the rectified voltage is filtered by inductor L1 and capacitors C2A and C2B; resistor R3 is a bleeder.

Voltage regulation of plus or minus 5% is achieved by varying the degree of saturation of the magnetic amplifier to compensate for load and line variations. The bias winding of the magnetic amplifier (in series with resistor R2) biases the magnetic amplifier partially into saturation. The bias winding is energized through resistor R2. The control winding of the magnetic amplifier (in series with fuse F3) senses voltage variations in the output and varies the voltage drop across the magnetic amplifier, thereby adjusting the voltage across the primary of transformer T1. The control winding is voltage referenced by voltage reference diodes CR1 and CR2 in series with potentiometer R5. Potentiometer R5 is adjusted until the desired output voltage is reached. Fuse F3 provides protection against short circuiting of the Zener diodes.

SECTION 5
TROUBLESHOOTING

5-1. GENERAL.

NOTE

The Bureau of Ships no longer requires the submission of failure reports for all equipments. Failure Reports and Performance and Operational Reports are to be accomplished for designated equipments to the extent required by existing directives. All failures shall be reported for those equipments requiring Failure Reports.

If d. c. output voltage is absent make the following checks:

a. Observe power indicating light DS1 for the presence of input power.

b. Check blown fuse indicators for XF1 and XF2. The neon lights in the knob sections of these fuseholders will glow to indicate a blown fuse. Spare fuses will be found in clip holders inside the bottom cover.

c. Check the a. c. voltage at the input to the silicon bridge rectifier. This should read approximately 48 or 120 volts. If an abnormally low voltage is indicated, an open condition may exist in transformer T1, in magnetic amplifier Z1, or in rectifiers CR7 or CR8.

d. Check the d. c. voltage across the filter capacitors. This should read approximately 48 or 120 volts. If no d. c. voltage is indicated, check capacitors C1, C2A and C2B where applicable for a possible shorted condition. Defective silicon rectifiers CR3, CR4, CR5, and CR6 will also cause the d. c. voltage to be low or absent.

e. Excessive variations in the d. c. output voltage may be caused by defective Zener diodes CR1 and CR2, magnetic amplifier Z1, diodes CR9 and CR10, or resistors R1, R2, and R5. Check indicating fuseholder F3. It indicates fuse has blown, diodes CR1 or CR2 may be shorted.

SECTION 6
REPAIR

6-1. FAILURE REPORT.

NOTE

The Bureau of Ships no longer requires the submission of failure reports for all equipments. Failure Reports and Performance and Operational Reports are to be accomplished for designated equipments to the extent required by existing directives. All failures shall be reported for those equipments requiring Failure Reports.

6-2. ADJUSTMENTS.

Except for resistor R5 described in section 2-4, Power Supply PP-3495/UG does not require any operational adjustments.

6-3. REPAIR

Figure 6-1 indicates the parts location in Power Supply.

Before any part is tested for a suspected defect, it should be disconnected from the circuit.

Circuit continuity and test points may be readily determined from figure 6-2, schematic diagram; and figure 6-3, wiring diagram.

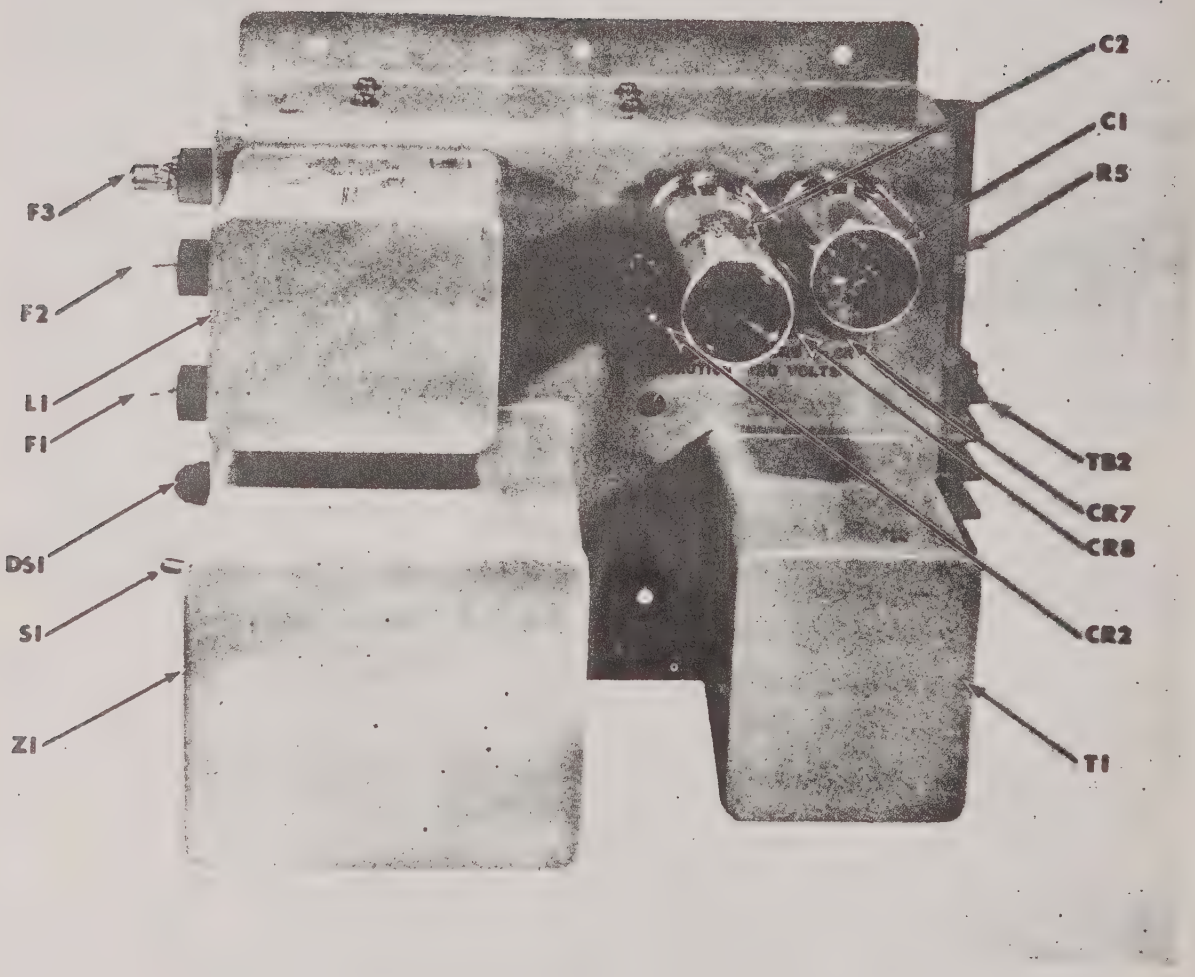


Figure 6-1. Power Supply PP-3495/UG, Top View

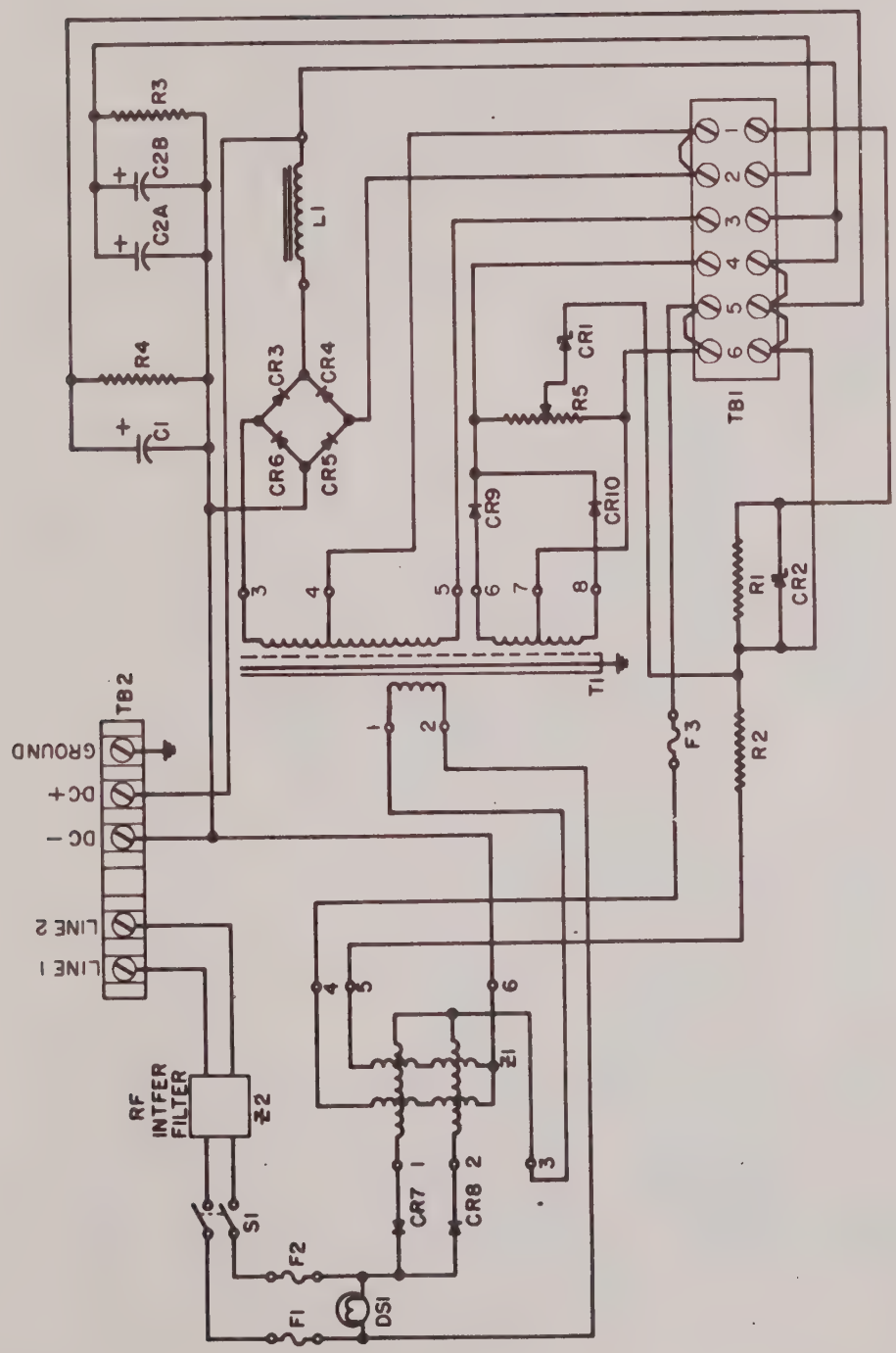


Figure 6-2. Power Supply PP-3495/UG, Schematic Diagram Wired for 48-Volt Operation

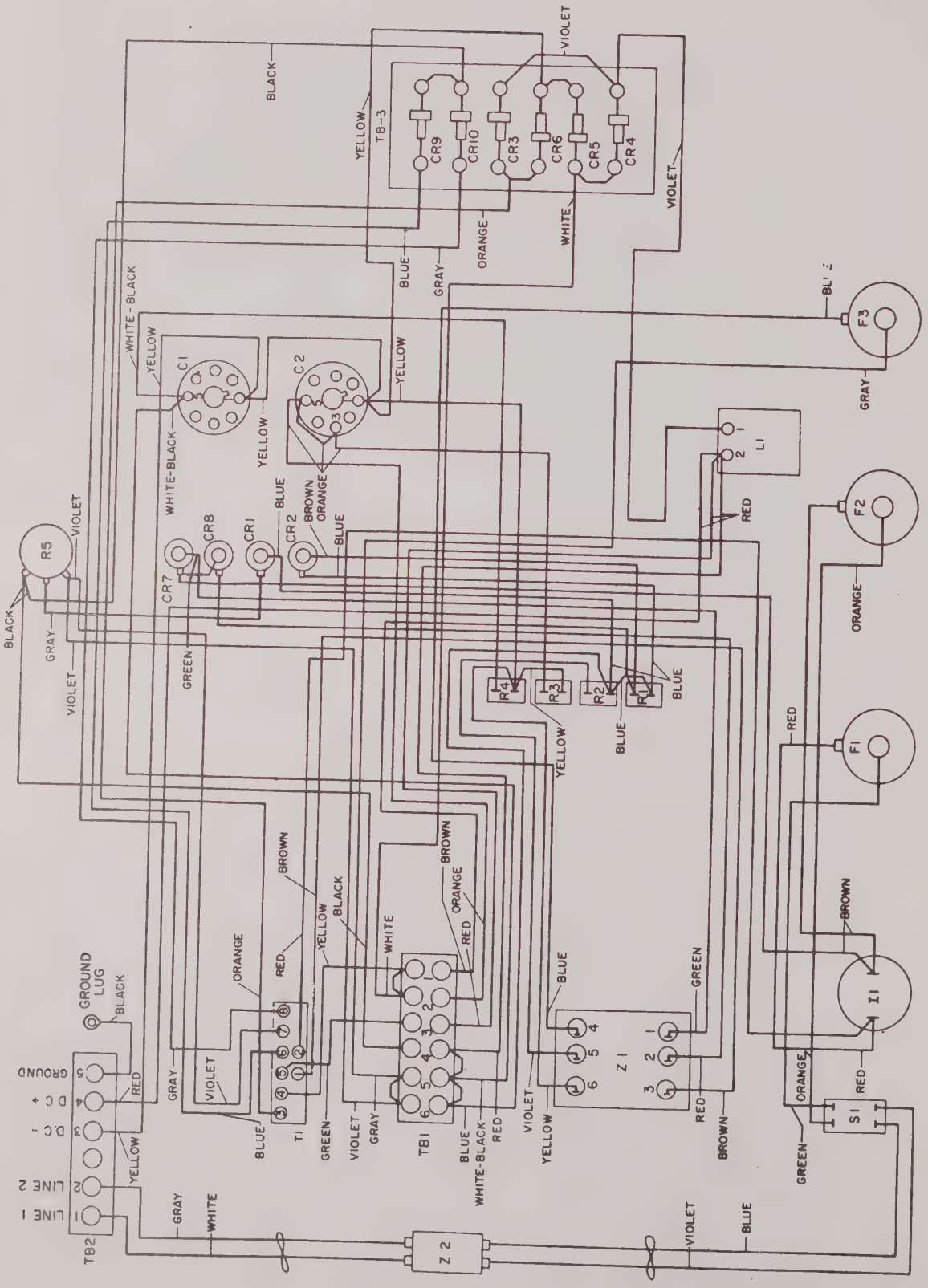


Figure 6-3. Power Supply, Wiring Diagram, Connected for 48-Volt Operation

SECTION 7
PARTS LIST

7-1. INTRODUCTION.

a. Reference designations, previously referred to as circuit symbols, have been assigned to identify all maintenance parts of the equipment. They are used for marking the equipment, adjacent to the part they identify, and are included on drawings, diagrams, and the parts list.

b. Stock number of parts used in this equipment may be obtained by referring to the Stock Number Identification Table (SNIT) published by E.S.O.

7-2. MAINTENANCE PARTS LIST.

Table 7-1 lists the maintenance parts for Power Supply PP-3495/UG.

Column 1 lists the reference designation of the various parts in alpha-numerical sequence.

Column 2 lists the name and description of the various items.

Column 3 lists the locating function of the part in the equipment.

7-3. LIST OF MANUFACTURERS.

Table 7-2 lists manufacturers of parts used in the equipment. Column 1 indicates the abreviations used to identify the Manufacturers.

Table 7-1. Maintenance Parts List

Reference Designation		Locating Function
CR1	SEMICONDUCTOR DEVICE, DIODE, 43V 10W, Zener, MIL type 1N2993B	Figure 6-3
CR2	SEMICONDUCTOR DEVICE, DIODE, 75V 10W, Zener, MIL type 1N3002B	Figure 6-3
CR3	CRYSTAL UNIT, RECTIFIER; JAN 1N540	Figure 6-3
CR4	CRYSTAL UNIT, RECTIFIER; JAN 1N540	Figure 6-3
CR5	CRYSTAL UNIT, RECTIFIER; JAN 1N540	Figure 6-3
CR6	CRYSTAL UNIT, RECTIFIER; JAN 1N540	Figure 6-3
CR7	CRYSTAL UNIT, RECTIFIER; MIL type 1N1124A	Figure 6-3
CR8	CRYSTAL UNIT, RECTIFIER; MIL type 1N1124A	Figure 6-3
CR9	CRYSTAL UNIT, RECTIFIER; JAN 1N538	Figure 6-3
CR10	CRYSTAL UNIT, RECTIFIER; JAN 1N538	Figure 6-3
C1	CAPACITOR, FIXED, ELECTROLYTIC; 500 mfd, 50 vdc, MIL type CE51C501G	Figure 6-3
C2	CAPACITOR, FIXED, ELECTROLYTIC; 160-160 mfd, 150 vdc, MIL type CE52C161J	Figure 6-3
DS1	LAMP,.NEON: General Electric Co. Part No. NE-51	Figure 6-3
F1	FUSE; 4 amp, MIL type FO2A250V-4A	Figure 6-3
F2	FUSE; 4 amp, MIL type FO2A250V-4A	Figure 6-3
F3	FUSE; 1/8 amp, MIL type FO2A250V-1/8A	Figure 6-3
L1	REACTOR; P/N DE1028, Type TF4RX04JB MIL-T-27A	Figure 6-3
R1	RESISTOR, FIXED, WIRE WOUND: 1800 ohms ±5% MIL type RW29	Figure 6-3
R2	RESISTOR, FIXED, WIRE WOUND: 820 ohms ±5%, MIL type RW29	Figure 6-3
R3	RESISTOR, FIXED, WIRE WOUND: 2000 ohms ±5%, MIL type RW29	Figure 6-3
R4	RESISTOR, FIXED, WIRE WOUND: 510 ohms ±5%, MIL type RW29	Figure 6-3

Table 7-1 (continued)

Reference Designation		Locating Function
R5	RESISTOR, VARIABLE; 50 ohms, ±10% MIL type RA20	Figure 6-3
S1	SWITCH, TOGGLE: MS35059-22	Figure 6-3
TB1	TERMINAL BOARD: MIL type 8TB6	Figure 6-3
TB2	TERMINAL BOARD: MIL type 42TB5	Figure 6-3
T1	TRANSFORMER, POWER: P/N DE1030 type TF4RX02JA, MIL-T-27A	Figure 6-3
XDS1	LIGHT, INDICATOR: MIL type LH76LC14RD	Figure 6-3
XF1	FUSEHOLDER: MIL type FHL17G	Figure 6-3
XF2	FUSEHOLDER: MIL type FHL17G	Figure 6-3
XF3	FUSEHOLDER: MIL type FHL18G	Figure 6-3
Z1	AMPLIFIER, MAGNETIC: P/N DE1027 type TF4RX41MA, MIL-T-27A	Figure 6-3
Z2	FILTER, RADIO INTERFERENCE: Filtron Co., Inc. Part No. DE1032	Figure 6-3

Table 7-2. List of Manufacturers

Name	Address
Filtron Company, Inc.	131-15 Fowler Ave., Flushing, N.Y.
General Electric Company	Miniture Lamp Div., Nela Park, Cleveland, Ohio

Table 7-3. Supplementary Parts List, Power Supply PP-3495B/UG

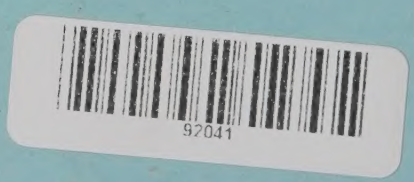
Reference Designation		Locating Function
CR1	SEMICONDUCTOR DEVICE, DIODE, 43V, 10W, Zener, MIL type 1N2993B	Figure 6-3
CR2	SEMICONDUCTOR DEVICE, DIODE, 75V,10W, Zener, MIL type 1N3002B	Figure 6-3
CR3	CRYSTAL UNIT, RECTIFIER; JAN 1N540	Figure 6-3
CR4	CRYSTAL UNIT, RECTIFIER; JAN 1N540	Figure 6-3
CR5	CRYSTAL UNIT, RECTIFIER; JAN 1N540	Figure 6-3
CR6	CRYSTAL UNIT, RECTIFIER; JAN 1N540	Figure 6-3
CR7	CRYSTAL UNIT, RECTIFIER; MIL type 1N1202	Figure 6-3
CR8	CRYSTAL UNIT, RECTIFIER; MIL type 1N1202	Figure 6-3
CR9	CRYSTAL UNIT, RECTIFIER; JAN 1N538	Figure 6-3
CR10	CRYSTAL UNIT, RECTIFIER; JAN 1N538	Figure 6-3
C1	CAPACITOR, FIXED, ELECTROLYTIC; 500 mfd, 50 vdc, MIL type CE51C501G	Figure 6-3
C2	CAPACITOR, FIXED, ELECTROLYTIC; 160-160 mfd, 150 vdc, MIL type CE52C161J	Figure 6-3
DS1	LAMP, NEON: General Electric Co. Part No. NE-51	Figure 6-3
F1	FUSE; 4 amp, MIL type F02A250V-4A	Figure 6-3
F2	FUSE; 4 amp, MIL type F02A250V-4A	Figure 6-3
F3	FUSE; 1/8 amp, MIL type F02A250V-1/8A	Figure 6-3

Table 7-3. Supplementary Parts List, Power Supply PP-3495B/UG (Cont)

Reference Designation		Locating Function
L1	REACTOR; C8839, Type MIL-T-27B	Figure 6-3
R1	RESISTOR, FIXED, WIRE WOULD: 1800 ohms ±5% MIL type RW29	Figure 6-3
R2	RESISTOR, FIXED, WIRE WOUND: 820 ohms ±5%, MIL type RW29	Figure 6-3
R3	RESISTOR, FIXED, WIRE WOUND: 2000 ohms ±5%, MIL type RW29	Figure 6-3
R4	RESISTOR, FIXED, WIRE WOUND: 510 ohms ±5%, MIL type RW29	Figure 6-3
R5	RESISTOR, VARIABLE; 50 ohms, ±10% MIL type RA20	Figure 6-3
S1	SWITCH, TOGGLE: MS35059-22	Figure 6-3
TB1	TERMINAL BOARD: MIL type 8TB6	Figure 6-3
TB2	TERMINAL BOARD: MIL type 42TB5	Figure 6-3
T1	TRANSFORMER,POWER: C8838 type TY4RX02YY, MIL-T-27B	Figure 6-3
XDS1	LIGHT, INDICATOR: MIL type LH76LC14RD	Figure 6-3
XF1	FUSEHOLDER: MIL type FHL17G	Figure 6-3
XF2	FUSEHOLDER: MIL type FHL17G	Figure 6-3
XF3	FUSEHOLDER: MIL type FHL18G	Figure 6-3
Z1	AMPLIFIER, MAGNETIC: C8842 type TF4RX41MA, MIL-T-27B	Figure 6-3
Z2	FILTER, RADIO INTERFERENCE: Part No. C8844	Figure 6-3

Table 7-4. List of Manufactuers, Power Supply PP-3495B/UG

Name	Address
General Electric Company	Nela Park, Cleveland, Ohio
J.BT. Instrument Company	133 Hamilton Street, New Haven, Connecticut
Kulka Electric Company	633 S. Fulton Avenue, Mt. Vernon, New York
General Electric Company	Auburn, New York
Metro-Tel Corp.	409 Railroad Avenue, Westbury, New York
Dialight Corporation	60 Stewart Avenue, Brooklyn, New York
C.T.S. Corporation	1142 W. Beardsley, Elkhart, Indiana
International Rectifier Corp.	233 Kansas Street, El Segundo, California
Littlefuse, Inc.	800 E. Northwest Hwy, Des Plaines, Illinois
Ohmite Manufacturing Co.	3655 W. Howard Street, Skokie, Illinois
General Instrument Co.	65 Gouverneur Street, Newark, New Jersey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